

OCCURRENCE OF *METAPHYCUS BARTLETTI* ANNECKE AND
MYNHARDT, A SOUTH AFRICAN PARASITE OF
BLACK SCALE, *SAISSETIA OLEAE* (OLIVIER)
IN CENTRAL AND NORTHERN CALIFORNIA
(HYMENOPTERA: ENCYRTIDAE;
HOMOPTERA: COCCIDAE)

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From 1976 through 1978 I conducted periodic field surveys to assess the natural enemy complex of the black scale, *Saissetia oleae* (Olivier), in central and northern California where the scale is a sporadic economic pest in commercial olive groves and on several ornamental trees and shrubs. The surveys were made in conjunction with a continuing program of periodic colonization of parasites newly introduced from the western Cape Province, South Africa, where *S. oleae* is thought to have originated (De Lotto, 1976).

Of special interest among the several parasite species recovered during the surveys was the presence of *Metaphycus bartletti* Annecke and Mynhardt, an African encyrtid not recorded previously from central and northern California.

Although the reports on colonization of beneficial organisms in California by the Division of Biological Control, University of California, Riverside, for the years 1958-1960, show that an encyrtid then identified as *Metaphycus inviscus* Compere was colonized on *S. oleae* infestations in six southern California counties (Fig. 1), it was not reported to have been released in central or northern California. The stock colonized as *M. inviscus* was originally obtained from *S. oleae* infesting olive near Stellenbosch, South Africa by B. R. Bartlett in 1958. Regarding colonization of the parasite, Bartlett (see Annecke and Mynhardt, 1972) stated, "recoveries were abundant the first year of release but it was not taken thereafter" Annecke and Mynhardt (1972) studied specimens of the stock colonized in southern California and concluded that they differed from *M. inviscus* as described by Compere (1940). The California material was then described as *M. bartletti* by Annecke and Mynhardt (1972) who illustrated the cryptic characters which separate the two species.

During the 1976-1978 surveys various host plants of *S. oleae* (principally olive) were examined at 225 sites in 18 central and northern California counties. Light to heavy infestations of *S. oleae* were sampled at 73 sites. At all other sites the scale was either absent or too scarce to permit sampling.

Table 1. Recoveries of *Metaphycus bartletti* from black scale samples according to counties during 1976–1978.

County	No. sample sites	Parasite recoveries—no. sites	No. parasites
Alameda ^a	5	3	107
Butte	4	2	69
Contra Costa ^a	5	4	167
Fresno	3	2	204
Glenn	5	1	2
Madera	2	0	0
Marin ^a	4	2	42
Merced	8	1	1
Placer	1	1	4
Sacramento	1	0	0
San Joaquin	9	0	0
San Luis Obispo ^a	1	0	0
Solano	1	1	1
Stanislaus	8	6	937
Sutter	3	1	8
Tehama	2	0	0
Tulare	8	2	20
Yolo	3	1	15
	<u>73</u>	<u>27</u>	<u>1577</u>

^a Coastal counties.

Results

As shown in Table 1, *M. bartletti* was recovered at 27 (37%) of the 73 sample sites. The parasite was recovered from 18 sites in 10 Central Valley counties and from 9 sites in 3 coastal counties. Thirty-one percent of the samples from the Central Valley counties and 53% of the samples from coastal counties yielded *M. bartletti*. Chronologically, *M. bartletti* was recovered at 7 of 15 sites in 1976, at 4 of 12 sites in 1977, and at 16 of 46 sites in 1978.

The frequency of recovery for *M. bartletti* (27 sites—13 counties) was second only to that for *M. helvolus* (Compere), another African species which was recovered at 42 sites in 17 counties. Total recoveries of *M. bartletti* (1577) were also second to those for *M. helvolus* (2477). Together they represented 71.2% of all parasite recoveries. Coincidental recoveries of *M. bartletti* and *M. helvolus* occurred at 20 sites. At these sites recoveries of *M. helvolus* were numerically superior to *M. bartletti* at 14 sites whereas *M. bartletti* was dominant in numbers at 6 sites.

Laboratory emergence records for *M. bartletti* showed that this species develops gregariously in nearly mature (rubber stage) scales. A lot of 50

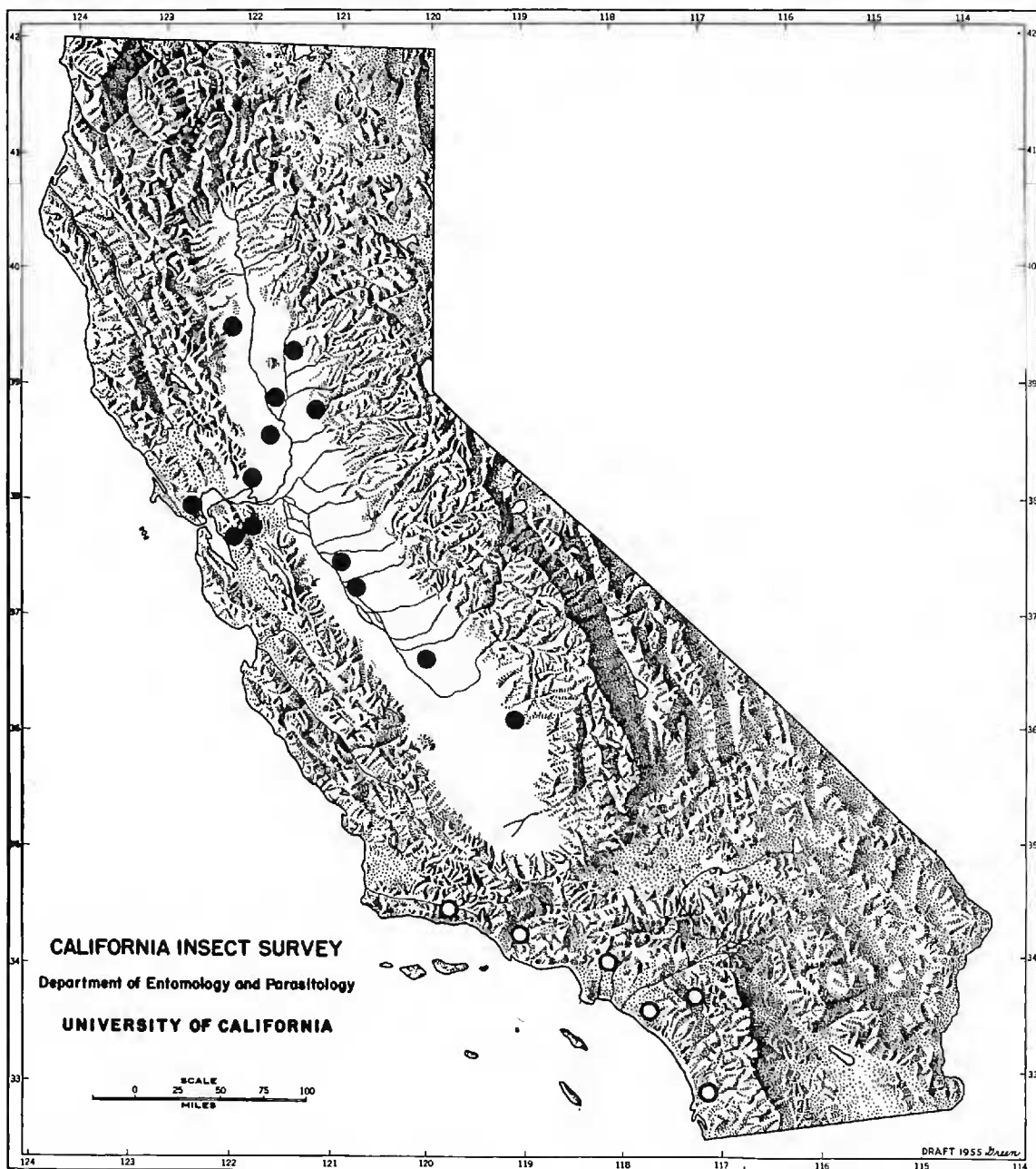


Fig. 1. Distribution of *Metaphycus bartletti* in central and northern California. Solid circles indicate areas where *M. bartletti* was recovered during 1976–1978 surveys. Open circles indicate areas where *M. bartletti* was colonized during 1958–1960.

mummified *S. oleae* (collected at Oakdale, Stanislaus County) yielded an average of 4 parasites/host (range, 2–8).

The wide distribution of *M. bartletti* in central and northern California (Fig. 1) suggests that the parasite has probably been expanding its range over a number of years, very likely throughout the period since it was first colonized in southern California in 1958–1960. The fact that Bartlett's releases some twenty years ago were confined to southern California localities suggests that *M. bartletti* is a recent arrival in central and northern California. Also, earlier sporadic samples of *S. oleae* taken from various localities in central and northern California by the author during the 1950's did not reveal the presence of *Metaphycus* species similar to *bartletti* or *invis-*

cus. Thus the possibility that *M. bartletti* became established in central and northern California prior to 1958 by some unexplained means is not indicated.

The source of colonizing stocks of *M. bartletti* responsible for its establishment in central and northern California is uncertain. Of several possible sources, transport by man of live plant material infested with parasitized scale hosts appears to afford the most logical explanation. Although relatively rapid natural dispersal of parasitic Hymenoptera is known to exist (DeBach, 1974), the relatively barren mountain ranges between southern and central California (Fig. 1) provide a formidable barrier to natural migration. While there remains a possibility that *M. bartletti* was released in central California during 1958–1960, this seems unlikely since it is a policy of the Biological Control divisions of the University of California to report all colonizations of beneficial organisms.

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